

Multifunctional Tank Structure with Integral TPS, Phase I

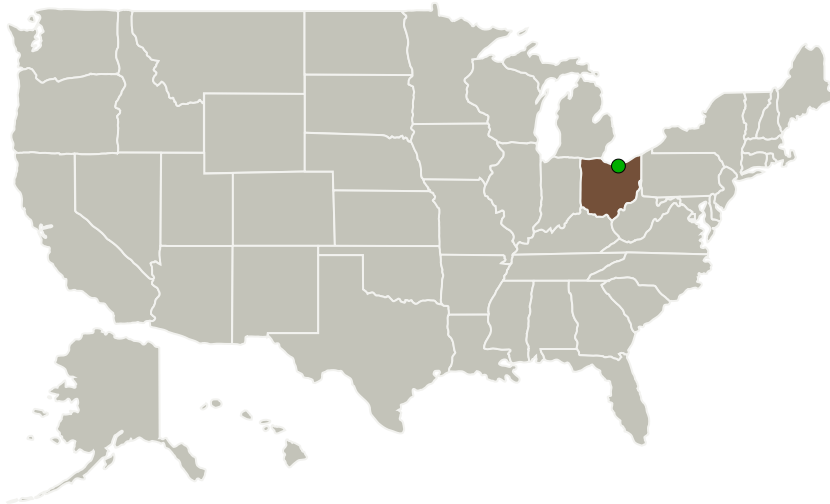
Completed Technology Project (2015 - 2015)



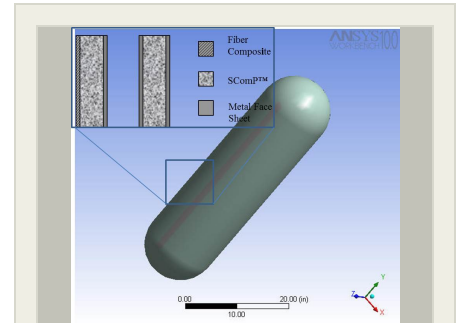
Project Introduction

This Phase I SBIR contract will apply the principles of integrated materials computational engineering to the design and fabrication of an integral thermal protection system for a cryogenic storage tank. ANSYS modelling will be carried out to sub-optimize the materials properties necessary for an integrated structure-insulation-thermal protection system using multilayered thermally insulating syntactic foams core structure. By combining structural and insulation performance in a high temperature structure, a 65-100% reduction in parasitic thermal protection weight can be achieved. Multilayer sandwich panel coupons will be fabricated and characterized for cryogenic to high temperature properties and thermal cycle response to validate the model, and manufacturing pathfinding efforts will be conducted for production of curved multilayered sandwich panels.

Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|-------------------------------|-------------------------|-------------|-----------------|
| Powdermet, Inc. | Lead Organization | Industry | Euclid, Ohio |
| ● Glenn Research Center(GRC) | Supporting Organization | NASA Center | Cleveland, Ohio |



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Primary U.S. Work Locations

Ohio

Project Transitions

June 2015: Project Start

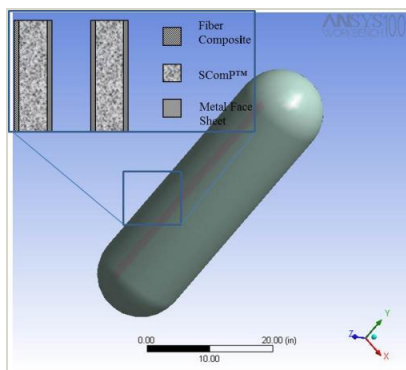
December 2015: Closed out

Closeout Summary: Multifunctional Tank Structure with Integral TPS, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/139268>)

Images



Briefing Chart Image

Multifunctional Tank Structure with Integral TPS, Phase I
(<https://techport.nasa.gov/image/131148>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Powdermet, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

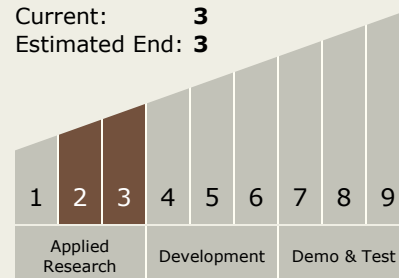
Carlos Torrez

Principal Investigator:

Mark Grogan

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.2 Structures
 - └ TX12.2.5 Innovative, Multifunctional Concepts

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System